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The *Subject Index of the Modern Books added to the Library of the British Museum* 1911–1915 (London, 1918), lists many books and memoirs of mathematical interest under such headings as: Aëronautics; algebra; arithmetic; calculus; functions, mathematical; hydraulics; hydrodynamics; mathematics; mechanics; surveying; tables; and trigonometry. The writings of American authors are well represented.

In *The Carnegie Foundation for the Advancement of Teaching, Thirteenth Annual Report of the President and of the Treasurer* (New York, October, 1918), are brief biographies of CHARLES LEE CRANDALL (1850–1917) and of NATHAN FELLOWES DUPUIS (1836–1917). Professor Crandall was connected with Cornell University most of his life and among books of which he was the author are: *Notes on descriptive geometry* (1888, 1893), *The transition curve* (1893, 1899), and *Textbook on geodesy and least squares* (1907). Professor Dupuis was a Canadian and he taught at Queen's University, his alma mater, for more than forty years. He built several well-known astronomical clocks, a sidereal clock built by him being still in use in the university observatory. In addition to numerous articles for periodicals Professor Dupuis wrote a *Treatise on geometrical optics* (1868); *Geometry of the point, line and circle* (1889); *Principles of algebra* (1893); *Elements of synthetic solid geometry* (1893); *Elements of trigonometry for practical science students* (1902); *Spherical trigonometry and astronomy* (1906); *Descriptive and mechanical astronomy* (1910); and *Measurement of time* (1915).

ARTICLES IN CURRENT PERIODICALS.

ANNALI DI MATEMATICA PURA ED APPLICATA, series 3, volume 28, no. 1, November, 1918: "Ulisse Dini" by L. Bianchi, i–ii. [Dini was born at Pisa in November, 1845, and died in his native city, October 28, 1918. He was professor of mathematics in the University of Pisa for over 50 years, and director of the R. Scuola Normale Superiore in Pisa since 1901. His books which were, for the most part, developments of university lectures, include the following: (1) *Fondamenti per la teoria delle funzioni di variabili reali*, Pisa, 1878; (German edition, 1892); (2) *Sopra le serie di Fourier ed altre le representazioni analitiche per le funzioni di una variabile*, Pisa, 1880; (there is a type-written English translation of this work, by W. B. Ford, in the Library of Harvard University); (3) *Teoria delle funzioni ellitiche* (autographed), 1893; (4) *Sugli sviluppi in serie per la rappresentazione analitica delle funzioni di una variabile reale date arbitrariamente in un certo intervallo*, Pisa, 1911; (5) *Lezioni di analisi infinitesimale*, Pisa, 1909–1915 (a forerunner of this thousand page work was the lithographed *Lezioni* of 1877–78).

A portrait and sketch of Dini are given in *Acta Mathematica, 1882–1912. Table générale des tomes 1–35*, Upsala, 1913].

BOLLETTINO DI BIBLIOGRAFIA E STORIA DELLE SCIENZE MATEMATICHE, volume 20, January–March, 1918: "Notizie su la Facoltà di scienze matematiche della R. Università di Modena" by E. Bortolotti, 1–11; Review by G. Loria of L Braude's *Les coordonnées intrinsèques. Théorie et application* (Paris, 1914), 12; Review by C. Rosati of E. Ciani's *Il metodo delle coordinate proiettive omogenee nello studio degli enti algebrici* (Pisa, 1915), 13–15; Review by E. E. Levi of G. Fubini's *Lezioni di analisi infinitesimale*. 2a ed. (1916), 15–16; Review by G. Vivanti of U. Dini's *Lezioni di analisi infinitesimale*, Vol. 2: calcolo integrale (Pisa, 1909–15), 17–18; Review by G. Fubini of G. Vivanti's *Equazioni integrali lineari*, (Milano, 1916), 18–20; Review by G. Loria of P. Ruffini's *Opere matematiche*, Vol. 1 (Palermo, 1915) and Euclid's *Il primo libro degli Elementi, testo greco, versione italiana, introduzione e note a cura di* G. Vacca (Firenze, 1916), 20–21; Review by P. Burgatti of G. Colonnetti's *Principi di statica dei solidi elastici* (Pisa, 1916), 22–29; Notizie, 30–32.

L'ENSEIGNEMENT MATHÉMATIQUE, volume 20, no. 1, January, 1918: "L' approximation des fonctions d'une variable réelle" by C. de la Vallée Poussin, 5–29; "Deux recents ouvrages de

Géométrie" [by Darboux and d'Ocagne] by A. Buhl, 30–42; "Remarques sur la construction des courbes gauches avec application a la parabole cubique" by G. Loria, 43–47; "Théorie élémentaire de la toupic gyroscopique" by M. Zack, 47–62; Review by M. Plancherel of R. Fueter's *Synthetische Zahlentheorie* (Leipzig, 1917), 70–71; Review by A. Reymond of A. N. Whitehead's *The Organization of Thought* (London, 1917), 73–76.—No. 2, September, 1918: "Sur les congruences linéaires de cubiques gauches douées d'une seule courbe singulière" by L. Godeaux, 81–89; "Sur la gerbe de cubiques gauches passant par cinq points" by F. Gouseth, 90–93; "Sur les trajectoires d'un mobile soumis à une force centrale et a une resistance de milieu" by C. Cailler, 93–96; "Sur certaines identités vectorielles et leurs interprétations dans la géométrie sphérique et plane" by M. F. Daniëls, 97–122; "Pensée axiomatique" by D. Hilbert, 122–136; Reviews by A. Buhl of E. Borel's *Leçons sur les fonctions monogènes uniformes d'une variable complexe* (Paris, 1917) and L. Lecornu's *Cours de Mécanique* (tome 3) and M. d'Ocagne's *Cours de géométrie pure et appliquée de l'Ecole Polytechnique* (Paris, 1918), 143–144, 147–154; Review by M. Plancherel of E. Landau's *Einführung in die elementare und analytische Theorie der algebraischen Zahlen und der Ideale* (Leipzig, 1918), 146–147.—No. 3, December: "Notions d'arithmogéométrie" by E. Turrière, 161–174; "Sur la 'variété moyenne' de deux variétés convexes" by G. Tiercy, 175–189; "Contribution à la construction des éléments doubles d'une involution hyperbolique" by F. Redl, 190–193; "Extraction de la racine $n^{\text{ième}}$ d'une nombre réel par approximations successives" by M. T. Béritch, 194–198; "Note sur les permutations" by A. Aubry, 199–215; "Sur la rectification approchée d'un arc de cercle" by A. Pleskot, 215–218; "A propos d'un problème de Lagrange sur la construction des cartes géographiques" by L. Ballif, 219–221; "J. H. Graf (1852–1918)" by L. Crelier, 224–225; Review by H. Fehr of *Scritti matematici offerti ad Enrico D'Ovidio in occasione del suo LXXV genetliaco, 11 agosto, 1918* (Turin, 1918), 229–230.

L'Intermédiaire des Mathematiciens, volume 25, November–December, 1918: "Albert Gauthier-Villars," 121–122; "Questions," 122–126; "Reponses," 127–144.

Journal of the Indian Mathematical Society, volume 10, no. 6, December, 1918: "Infinite series and arithmetical functions" (conclusion) by F. Hallberg, 454–472; "Note on triangles inscribed in an ellipse" by A. N. Raghavachar, 473–475; "On poristic polygons" by F. H. V. Gulasekharam, 475–476; "A geometrical problem" [Given the circumcircle and the orthocenter of a triangle to find the locus of the in- and ex-centers"] by M. T. Naraniengar, 476–478; "In Memoriam" [R. J. Pocock], 479; Problems and solutions, 480–492.

Mathematical Gazette, volume 9, May, 1918: "The elementary theory of statical stability" by S. Brodetsky, 233–236; "Alice through the (convex) looking glass" by W. Garnett, 237–241; "The introduction to infinite series" by W. J. Dobbs, 242–246; "The teachers' library," i–vi. [This last article purports to give "a suggestive list of books suitable for inclusion in the mathematical library of a modern secondary school." In the list are scores of books such as: H. Weber, *Lehrbuch der Algebra*, 3 vols.; P. Muth, *Theorie und Anwendung der Elementarteiler;* E. Pascal, *Gruppi di trasformazioni;* Hamilton, *Elements of quaternions*, 2 vols., and Forsyth, *Theory of differential equations*, 6 vols.]—July: "Alice through the (convex) looking glass" (continued) by W. Garnett, 249–252; "The introduction to infinite series" (continued) by W. J. Dobbs, 253–256; "MacCullagh," 256; Note on the spherical triangle and haversines by E. M. Langley, 257–259; Review by G. Greenhill of D'Ocagne's *Cours de géométrie* (Paris, 1917–18), 261–262—October–December: "Mathematical Association teaching committee, report on the teaching of mechanics" by T. P. Nunn, A. W. Siddons, W. J. Dobbs, and G. Goodwill, 265–292 —January, 1919: "Alice through the (convex) looking glass" (concluded) by W. Garnett, 293–298; "Gleanings far and near" [from *Recollections of Mary Somerville*], 298, 307; "The introduction to infinite series" (concluded) by W. J. Dobbs, 299–301; "A letter from Sir William Rowan Hamilton," 302; "Notes on the life and works of Colin Maclaurin" by C. Tweedie, 303–305; "The equilibrium of jointed frameworks" by G. H. Bryan, 306–307; Review by H. P. Hilton of Darboux's *Principes de géométrie analytique*, 308.

Nouvelles Annales de Mathématiques, volume 77, November, 1918: "Sur les foyers rationnels d'une courbe algébrique plane ou gauche" by P. Appell, 401–402; "Sur les courbes algébriques planes" by R. Bouvaist, 403–417; "Sur deux points du plan d'un triangle et sur une généralisation des points de Brocard" by R. Goormaghtigh, 417–424; "Quelques applications géométriques de la théorie des infiniment petits" by M. Weill, 424–429; "Nouvelles identités" by G. Fontené, 430–431; "Sur la chainette d'égale résistance" by F. Balitrand, 431–433; Solutions and Questions, 434–440.

Quarterly Journal of Pure and Applied Mathematics, volume 48, no. 1, October, 1917: "An expansion related to Stirling's formula, derived by the method of steepest descents"

by G. N. Watson, 1–18; "On parallel curves and evolutes" by A. B. Basset, 19–39; "Some theorems in four-dimensional analysis" by C. E. Weatherburn, 39–58; "The attraction of equiangular spirals" by S. Brodetsky, 58–76; "The normal number of prime factors of a number n" by G. H. Hardy and S. Ramanujan, 76–92; "On the representations of numbers as a sum of $2r$ squares" by L. J. Mordell, 93–96—no. 2, September, 1918: "On the representations of numbers as a sum of $2r$ squares" by L. J. Mordell, 97–104 (conclusion); "On two loci determined by concurrent tangents to plane curves" by C. H. Sisam, 104–112; "Note on asymptotic formulæ for oscillating Dirichlet's integrals" by M. Kuniyeda, 113–135; "Moving axes with variable angles" by E. H. Neville, 136–141; "On a theorem in the theory of differentiation of functions defined by integrals" by G. Fichtenholz, 142–147; "Substitution groups on the terms of symmetric polynomials" by G. A. Miller, 147–150; "On early tables of logarithms and the early history of logarithms" by J. W. L. Glaisher, 151–192.

Revue de Métaphysique et de Morale, volume 26, no. 1, January–February, 1919: "L'entropie, extension conservative" by L. Selme [died January 3, 1919], 89–118; "Gaston Milhaud," 149–151; [Quotation: "Peu d'esprits donnaient au même degré que lui l'impression de la puissance spirituelle, qui s'impose par sa seule lumière, sans prestige matériel et sans contrainte. A toute sa philosophie on pourrait donner pour epigraphe les deux mots qui servaient déjà de conclusion à son premier ouvrage, et qu'il opposait 'aux subtilités d'analyse dont se joue la marche de l'esprit humain': Raison et Liberté"].

Revue générale des Sciences, volume 29, no. 23, December 15, 1918: "Gaston Milhaud" by A. Lalande. [Quotation: "Tous ceux qui l'approchaient étaient attirés et retenus par le charme de sa personne, la finesse de son esprit, la sûreté de son caractère et de ses affections. Jamais philosophe n'a discuté avec plus d'aimable courtoise; et cependant,—ou peut-être par là-même,—il trouvait le moyen de ne rien abandonner de son opinion et souvent de persuader son interlocuteur." Milhaud was born in 1858 and died October 1, 1918. At the age of 20 years he was admitted to both the Ecole polytechnique and the Ecole normale supérieure, but chose the latter and became agrégé ès science mathématique in 1881. He taught in several lycées before he was appointed professor at the University of Paris. He published his *Leçons sur les origines de la science grecque* in 1893. Soon afterwards he became doctor ès lettres at the University of Paris, his principal thesis being *L'essai sur les conditions et les limites de la certitude logique* (1894, 2e éd. 1898). Of his other books the following may be mentioned: *Les philosophes-géomètres de la Grèce: Platon et ses prédécesseurs* (1900); *Le positivisme et le progrès de l'esprit* (1902); *Etudes sur la pensée scientifique chez les Grecs et chez les modernes* (1906); *Nouvelles études sur l'histoire de la pensée scientifique* (1911).]—January 15, 1919: Review by J. Boyer, of Sedgwick and Tyler's *A Short History of Science* (New York, 1918), 28—February 28: "L'avenir du catalogue international de la littérature scientifique," supplément, 17; "Reprise de la publication de la Revue *Isis*" by G. Sarton, supplément, 17.

School Science and Mathematics, volume 19, no. 3, March, 1919: "Proceedings of the eighteenth meeting of the Central Association of Science and Mathematics Teachers," 197–199, 204–208, 265–268; "Progressive science and mathematics courses and teaching in France" by A. Barthelemy, 199–204; "Final report of subcommittee on content of course in first-year mathematics," 259–264; Problems and solutions, 275–281.

Science, volume 49, February 28, 1919: "Common numerals" by G. A. Miller, 215. [Quotation: "It is very interesting to note that during recent years available data relating to the origin of our common number symbols have been carefully reexamined by Carra de Vaux, who published in volume 21 of *Scientia* a brief summary of his results. Among the most surprising of these results are the following: Our common number symbol originated in Europe and from there were transmitted to the Persians. Both India and Arabia received them from Persia, so that the common term *Hindu-Arabic numerals* is decidedly misleading. The common numerals did not come from letters of the alphabet, but were formed directly for the purpose of representing numbers.

It does not appear likely that all of these conclusions reached by Carra de Vaux, who has made an extensive study of intellectual life among the Mohammedans, will be at once accepted, but they tend to exhibit the weak foundation upon which the history of our common numerals has thus far rested."]

Scientia, volume 82, February, 1919: "Sur l'introduction de la méthode des perturbations dans la mécanique générale" by J. M. Plans, 89–93; Reviews, by G. Scorza, of Darboux's *Leçons sur la théorie générale des surfaces*, 2e partie, 2 éd. (Paris, 1915), Darboux's *Principes de géométrie analytique* (Paris, 1917), and of Halphen's *Oeuvres*, tome 1 (Paris, 1916), 147–149.

SCIENTIFIC MONTHLY, volume 8, no. 3, March, 1919: "Charles Edward Pickering" and full-page portrait, 284–286.

SEWANEE REVIEW, volume 27, January–March, 1919: "Edward Kidder Graham" [1876–1918, president of the University of North Carolina], by A. Henderson, 101–106.

TRANSACTIONS OF THE ACADEMY OF SCIENCES OF ST. LOUIS, volume 23; all of the mathematical articles so far published in this volume are by the septuagenarian physicist, F. E. Nipher, author of the little book *Introduction to graphical algebra* published about twenty years ago. No. 4, July, 1916: "Disturbances impressed upon the earth's magnetic field," 153–162; "Gravitation and electrical action," 163–175—No. 5, November, 1917: "Gravitational repulsion," 177–192—No. 6, May, 1918: "Graphical algebra involving functions of the *n*th degree," 193–204—No. 7, January, 1919: "Graphical algebra," 205–212.

TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY, volume 20, no. 1, January, 1919: Portrait frontispiece and notice of Maxime Bôcher; [This portrait may be obtained by sending twenty cents in postage stamps to the Society, 501 West 116th Street, New York City.] "Necessary conditions in the problems of Mayer in the calculus of variations" by G. A. Larew, 1–22; "Linear equations with unsymmetric systems of coefficients" by Anna J. Pell, 23–39; "On convex functions" by H. Blumberg, 40–44; "Projective transformations in function space" by L. L. Dines, 45–65; "On the order of primitive groups (IV)" by W. A. Manning, 66–78.

AMERICAN DOCTORAL DISSERTATIONS.

G. S. COUNTS, *Arithmetic tests and studies in the psychology of arithmetic* (Supplementary Educational Monographs, vol. 1, no. 4). University of Chicago Press, Chicago, 1917. 4 + 127 pp. (Chicago, 1916.)

G. JAMES, 1882– , *Some theorems on the summation of divergent series.* New York, 227 West 17th St., W. D. Gray, 1917. 28 pp. (Columbia, 1917.)

W. S. MONROE, *Development of arithmetic as a school subject.* (Reprinted from *United States Bureau of Education,* Bulletin, 1917, no. 10.) Washington, D. C., 1917. 170 pp. (Chicago, 1915.)

AGNES L. ROGERS, *Experimental tests of mathematical ability and their prognostic value.* (Teachers College, Columbia University. *Contributions to Education,* no. 89.) New York, Columbia University, 1918. 5 + 118 pp. (Columbia University, 1917.)

C. H. YEATON, 1886– , *Surfaces characterized by certain special properties of their directrix congruences.* (Reprinted from *Annali di matematica,* series 3, vol. 26, 1916.) 3 + 33 pp. (Chicago, 1915.)

UNDERGRADUATE MATHEMATICS CLUBS.

EDITED BY U. G. MITCHELL, University of Kansas, Lawrence.

CLUB ACTIVITIES.

THE MATHEMATICS CLUB OF THE UNIVERSITY OF KANSAS, Lawrence, Kansas. [1918, 35–36, 450–1, 459.]

The officers of the club for the year 1918–19 are as follows: President, Wealthy Babcock '19; vice-president, Faye Dodderidge '19; secretary-treasurer, Edith Whitcher '19; reporter, Viola Engle '19; faculty adviser, Professor Charles H. Ashton; program committee, Rachel Bell '19, Viola Engle '19, Faye Dodderidge '19, Josephine Montague '19.

Below are given the programs for the winter and spring quarters.

December 30, 1918: "Chief contributions of mathematics to astronomy" by Professor Ellis B. Stouffer.